

SWBAT: identify misconceptions about current and define resistance

Jan 4-7:20 AM

# Welcome!!!

H. Leslie Grebe

\* Pick up:

- 2 slips of paper (1 for later)
- get your yellow concept sheet from the slot
- whiteboard, marker, eraser



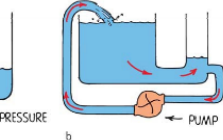
Opening Question (on 1 slip of paper):

What is most confusing about this electricity stuff?

Centering

Sep 7-7:04 AM

Pressure



b

t: 6 rows total

An electron is  $1.6 \times 10^{-19} \text{ C} = .000000000000000000016 \text{ C}$

Meaning	Symbol	Units	Analogy
<b>CHARGE</b> PROPERTY OF PROTONS & ELECTRONS THAT CAUSES ATTRACTION & REPULSION	$q$	COULOMBS $C$	MEASURE WATER THE WATER ITSELF
<b>VOLTAGE</b> = ELECTRIC POTENTIAL POTENTIAL BASED ON POSITION IN AN ELECTRIC FIELD "PUSH"	$V$	VOLTS $V$ $V = \frac{J}{C}$	PUMP WATER PRESSURE UP HIGH
<b>CURRENT</b> THE FLOW OF ELECTRIC CHARGE $= \frac{\text{CHARGE}}{\text{TIME}}$	$I$ $I = \frac{q}{t}$	AMPERE $A$ $1A = \frac{C}{s}$	FLOW OF WATER $\frac{q}{I \cdot t}$

Feb 23-7:34 AM

## Electrons in a wire demo

How many protons in the wire? 8

How many electrons in the wire? 8

Is the wire positive, negative, or neutral? (+, -, or 0)

How many electrons are in the wire while / after current flows? 8

What charge is the wire now? (+, -, or 0)

T/F: The electron that got pushed in is the one that came out

T/F: Something came out of the wire as soon as something went in (The flow was fast)

T/F: The electrons inside moved super fast, raced from one end of the tube to the other.

Feb 28-7:46 AM

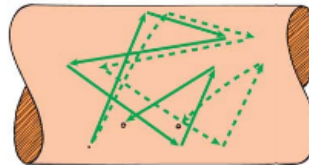
"Current" misconceptions...TRUTHWIRES ALWAYS HAVE  
PROTONS & ELECTRONSFLOW STARTS SUPER  
FAST, BUT  $\bar{e}$ 'S MOVE  
SLOWLY3) Wires are neutral when  
a current is flowing  
through themMISCONCEPTION1) Wires are empty of  
electrons and filled up  
when there's a current

2) Electrons flow super fast

$$\bar{e}_{IN} = \bar{e}_{OUT}$$

FIGURE 34.14

The solid lines depict a random path of an electron bouncing off atoms in a conductor. The dashed lines show an exaggerated view of how this path changes when an electric field is applied. The electron drifts toward the right with an average speed less than a snail's pace.



Feb 23-7:43 AM

Concept sheet: 6 rows total

Concept	Meaning	Symbol	Units	Analogy	Bike
CHARGE	PROPERTY OF PROTONS & ELECTRONS THAT CAUSES ATTRACTION & REPULSION	$q$	COULOMBS $C$		
VOLTAGE = ELECTRIC POTENTIAL	POTENTIAL BASED ON POSITION IN AN ELECTRIC FIELD "PUSH"	$V$	VOLTS $V$ $V = \frac{J}{C}$	LEGS, PEDALS "THE PUSH"	
CURRENT	THE FLOW OF ELECTRIC CHARGE $= \frac{CHARGE}{TIME}$	$I$ $I = \frac{q}{t}$	AMPERE $A$ $1A = \frac{C}{s}$	WHEELS, CHAIN/ MOVING	$\frac{q}{I \cdot t}$
RESISTANCE	OPPOSITION OF CURRENT "AGAINST THE FLOW"	$R$	OHMS $\Omega$	BRAKES	

Feb 23-7:34 AM

Current, Voltage, and Resistance: The Bicycle Analogy

If I were to pedal a bike while gently squeezing the hand brakes, what in that situation would be like  
current?  
voltage?  
resistance?

I: WHEELS,  
CHAIN  
MOVING  
V: PEDALS,  
PUSH  
R: BRAKES



Mar 7-7:33 AM

BASE LEVEL	BASE LEVEL	BASE SPEED
VOLTAGE Pedaling Effort	RESISTANCE Braking	CURRENT Speed of bike?
Same	More	DOWN
Same	Less	UP
More	Same	UP
Less	Same	DOWN

Feb 23-7:43 AM

**Daily 3 Questions**

- \* Every day except test/project days
- \* 3 Questions on the topics of the day
- \* Main source of daily points
- \* I am happy to give credit when I have no concerns about someone giving or getting help with the answers.

CP Hmwk - create 2 higher-order questions based on the yellow sheet

You can't get your points if you don't have your **NAME!!!**

Name	Period
1.	
2.	
3.	

Sep 9-7:32 AM

1. True or **False**: **Wires become negatively charged** by the electrons pumped into them when they have a current flowing through them.

**NEUTRAL:  $e^-$  IN =  $e^-$  OUT**

2. Resistance is defined as the opposition of **CURRENT**.

3. In our bike analogy, the brakes are like

A. current

B. voltage

**C. resistance**

Feb 18-6:59 AM